

**Programming Instructions for
Revenue Assurance Premium Calculations
For 2003**

American Farm Bureau Insurance Services, Inc

December 1, 2002

RA Programming Instruction Changes

Date	Change Made
May 14, 2001	Original Release
May 18, 2001	Modified the per-acre enterprise unit premium calculations (Equations 14, 15 and 16) to incorporate the Short Rate Factor. Modified the per-acre whole-farm unit premiums calculations (Equations 22, 23, and 24) to incorporate the Short Rate Factor.
August 30, 2001	Added a note to set <i>rateou</i> equal to the written agreement rate when a written agreement is in place. Added a note about 80% and 85% coverage for basic and optional units being allowed where that coverage is available under the APH program for spring planted crops.
September 14, 2001	Modified the basic unit premium calculations (Equations 6, 7, and 8) to include the SR, FN and FO factors. Modified the per-acre enterprise unit premium calculations (Equations 14, 15, and 16) to incorporate the SR, FN and FO factors. Modified the per-acre whole-farm unit premiums calculations (Equation 22, 23, and 24), to incorporate the SR, FN and FO factors.
December 2001,	Added states and crops, including Louisiana cotton and rice, Arkansas cotton and rice, and cotton in Oklahoma, Arizona and New Mexico. The addition of two new crops created the need to define new whole-farm variables for Louisiana, Arkansas, and Oklahoma. Added definitions of <i>beta</i> , <i>betawf</i> , and <i>betawfala</i> .
July 15, 2002	Added <i>CR</i> factor for canola and redefined prevented planting factors <i>PP65</i> and <i>PP70</i> to <i>PP5</i> and <i>PP10</i> to account for different base levels of prevented planting coverage on some crops.
July 26, 2002	Corrected minor typos found by RMA in review of RA expansion request for 2003.
August 23, 2002	Added the cotton and rice moral hazard surcharge factors, <i>mhfcctr</i> , to premium calculations.
September 11, 2002	Edited items pointed out by RMA staff.
November 12, 2002	Modified surcharge factors (now called residual factors, <i>residfcctr</i>) for cotton and rice and defined new surcharge factors for corn and soybeans. Added an appendix that shows how to calculate malting barley premiums.
December 1, 2002	Adding MBacre in worked example in Appendix B.

1. Introduction	1
2. Data and Variable Definitions	1
3. Available Coverage Amounts	4
Basic (or optional) units	4
Enterprise units.....	4
Whole-farm unit	5
4. Basic Unit Premiums.....	5
Base premium rate.....	5
Loaded per-acre premiums.....	6
Total basic unit premiums	7
Total optional unit premium.....	7
5. Enterprise Unit Premiums	7
Base premium rate for enterprise unit	9
Per-acre enterprise unit premiums.....	9
Total loaded enterprise premiums	9
6. Whole-Farm Unit Premium.....	10
Whole-farm base premium rate.....	11
Checking to See if Maximum Whole-Farm Discount is Exceeded	24
Per-acre whole-farm unit premiums.....	25
Total whole-farm unit premiums.....	25
7. Premium Subsidy	26
Optional and basic units	26
Enterprise unit	26
Whole-farm unit	26
8. Producer Paid Premiums	27
Optional and basic units	27
Enterprise unit	27
Whole-farm unit	27
Appendix A. Identification of Counties in Southern Minnesota and South Dakota	28
Appendix B. Premium Calculation for RA Malting Barley Endorsement.....	30

1. Introduction

This document contains detailed instructions for calculating Revenue Assurance (RA) premiums in the 2003 crop year including fall crops planted in 2002. Unless otherwise indicated, results of arithmetic calculations should be rounded to 9 digits to the right of the decimal.

2. Data and Variable Definitions

Much of the data that is required for calculation of RA premiums can be found on the actuarial pages of the APH program. A subset of the APH data will need to be found on the new RA actuarial page. The definitions of the data that are to be located on the RA actuarial page are given below. The variable names will be indexed by j for a crop and i for a unit of the crop in the equations. For example, $rate(j,i)$ refers to the base premium unit rate for crop j , unit i where $j = c, s, w, cn, sf, b, ww, ct, r$ refers to crop corn, soybeans, spring wheat, canola, sunflower, barley, winter wheat, cotton, or rice. To reduce unnecessary clutter the values for the j subscript will not be repeated subsequently unless needed for clarity.

<i>yldREF</i>	The reference yield for a crop in a county.
<i>rateou</i>	The base premium rate for an optional unit for the APH program at the 65% coverage level calculated using premium rate using the first eight steps of the continuous rating method. This rate will include the five percent surcharge for cupped yields (if appropriate), any adjustments required for high risk land involving the high risk land rating factor (associated Map Area, M13, rectype 11, field 20, Map Area, pos. 98), and the winter wheat endorsement factor.
<i>rate</i>	The base premium rate for a basic unit in the APH program to be used in the RA rating equations for all units.
<i>srfctr</i>	Combine the SR, FN, and FO option factors by multiplying them together and round to three decimals.
<i>crfctr</i>	Canola rotation surcharge factor applicable when acreage rotation is broken.
<i>residfctr</i>	Residual factors for optional and basic units.
<i>warate</i>	Written agreement rate. This rate replaces <i>rateou</i> in determining RA premiums when a written agreement is in place on a unit.
<i>minratefactor</i>	A factor used to determine the minimum whole-farm premium rate
<i>PP5</i>	The APH prevented planting factor for a crop for +5% prevented planting coverage (option code PF, M13, rectype 11, field 46, Common Option Codes, pos 259)

<i>PP10</i>	The APH prevented planting factor for a crop for +10% prevented planting coverage (option code PT, M13, rectype 11, field 46, Common Option Codes, pos 259)
<i>beta</i>	The coefficients used to calculate per-acre premium rates for optional, basic, and enterprise units. These coefficients vary by state and crop.
<i>betawf</i>	The coefficients used to calculate premium rates for whole-farm units in all states except Arkansas, Louisiana, and Oklahoma.
<i>betawfa</i>	The coefficients used to calculate premium rates for whole-farm units in Arkansas, Louisiana, and Oklahoma.

Other data used to calculate premiums are supplied by the farmer, supplied by the insurance agent, or supplied by the program. Data that is specific to each unit (basic or optional) is given below:

<i>fyld</i>	Approved APH yield for the basic (or optional) unit following standard APH procedures. This yield is used to calculate coverage levels and revenue guarantees. (60% APH Adjusted Election, when applicable.) It is calculated following APH procedures that account for the effects of including yield floors, cups, caps, and possible substitution of T-yields. (M13 rectype 11, field 28, Yield, pos 128)
<i>acre</i>	Acres in the crop on the basic (or optional) unit (M13 rectype 11, field 34, reported acres, pos 176)
<i>share</i>	The farmer's share on a basic (or optional) unit of a crop (M13, rectype 11, field 38, insured share, pos. 210)
<i>revb</i>	The selected per-acre revenue level for a basic (or optional) unit of a crop (M13, rectype 11, field 29, Dollar Amount of Insurance, pos. 138)
<i>reve</i>	The selected per-acre revenue level for an enterprise unit (M13, rectype 11, field 29, Dollar Amount of Insurance, pos. 138)
<i>revwf</i>	The selected per-acre revenue level for the whole-farm unit (M13, rectype 11, field 29, Dollar Amount of Insurance, pos. 138)
<i>nsect</i>	Number of sections in which a crop is grown (M13, rectype 11, field 69, Number of sections, pos. 417)

The prices that are supplied by RMA are:

<i>chip</i>	The projected harvest price of a crop (M13, rectype 11, field 36, Price Election Amount, pos. 194)
-------------	--

And the price volatilities that are supplied by RMA are:

<i>cvp</i>	Price volatility of the crop
------------	------------------------------

Variables that are either calculated by the program or supplied by the user and directly used to calculate premiums are:

<i>cover</i>	Coverage level on a basic (or optional) unit (M13, rectype 11, field 31, Coverage Level Percent, pos. 158)
<i>ecover</i>	Coverage level on an enterprise unit (M13, rectype 11, field 31, Coverage Level Percent, pos. 158)
<i>covwf</i>	Coverage level on a whole-farm unit (M13, rectype 11, field 31, Coverage Level Percent, pos. 158)

Some other variables that are calculated by the program are:

<i>premr</i>	Base premium rate for a basic (or optional) unit (M13, rectype 11, field 42, Base Premium Rate, pos. 233)
<i>epremr</i>	Base premium rate for an enterprise unit (M13, rectype 11, field 42, Base Premium Rate, pos. 233)
<i>wfpremr</i>	Base premium rate for a whole-farm unit (M13, rectype 11, field 42, Base Premium Rate, pos. 233)
<i>wfprem</i>	Base per-acre premium for a whole-farm unit
<i>avgrate</i>	Weighted average BPR rate for an enterprise unit
<i>erate</i>	Adjusted average BPR rate for an enterprise unit
<i>efyld</i>	Weighted average APH yield for an enterprise unit
<i>perlia</i>	Percent of expected liability from a crop on a whole-farm unit
<i>LP</i>	Per-acre loaded premium for a basic (or optional) unit (M13 rectype 11, field 44, Loaded Premium Per Acre, pos. 249)
<i>TLP</i>	Total loaded premium for a basic (or optional) unit (M13 rectype 11, field 56, Total Premium, pos. 346)
<i>LEP</i>	Per-acre enterprise premium for a crop (M13 rectype 11, field 44, Loaded Premium Per Acre, pos. 249)
<i>TLEP</i>	Total loaded enterprise premium for a crop (M13, rectype 11, field 56, Total Premium, pos. 346)
<i>LWFP</i>	Per-acre loaded whole-farm unit premium (M13 rectype 11, field 44, Loaded Premium Per Acre, pos. 249)
<i>TLWFP</i>	Total loaded whole-farm unit premium (M13, rectype 11, field 56, Total Premium, pos. 346)
<i>subfact</i>	Premium subsidy factor on an optional or basic unit
<i>subfacte</i>	Premium subsidy factor on an enterprise unit
<i>subfactwf</i>	Premium subsidy factor on a whole-farm unit
<i>psub</i>	Premium subsidy on a basic (or optional) unit

<i>psube</i>	Premium subsidy on an enterprise unit
<i>psubwf</i>	Premium subsidy on a whole-farm unit
<i>TLPsub</i>	Subsidized premium (M13, rectype 11, field 62, Producer Premium, pos. 388)
<i>TLEPsub</i>	Subsidized enterprise premium (M13, rectype 11, field 62, Producer Premium, pos. 388)
<i>WFPsub</i>	Subsidized whole-farm premium (M13, rectype 11, field 62, Producer Premium, pos. 388)
<i>premb</i>	Producer paid premium per acre for a basic (or optional) unit
<i>preme</i>	Producer paid premium per acre for an enterprise unit
<i>premwf</i>	Producer paid premium per acre for a whole-farm unit

3. Available Coverage Amounts

Revenue Assurance offers revenue guarantees that are 65%, 70%, and 75% of the product of projected harvest price and approved yield for basic and optional units. In addition, Revenue Assurance offers revenue guarantees that are 80% and 85% of the product of projected harvest price and approved yield for crops (except cotton) in counties where 80% and 85% coverage levels are available under the APH program. **These high coverage levels are not allowed for cotton on basic and optional units.**

Basic (or optional) units

The farmer selects a coverage level of 65%, 70%, or 75%, or, if allowed, 80% or 85%. The values for the per-acre revenue guarantees (rounded to the nearest cent) are then calculated for all crops j , and all units i , $i = 1, \dots, N(j)$:

$$(1) \quad revb(j,i) = cover(j) \cdot fyld(j,i) \cdot chip(j), i = 1, \dots, N(j)$$

Enterprise units

The farmer selects a coverage level of 65%, 70%, 75%, 80%, or 85%. The values for the per-acre revenue guarantees (rounded to the nearest cent) are then calculated for all crops j

$$(2) \quad reve(j,i) = ecover(j) \frac{chip(j) \sum_{i=1}^{N(j)} share(j,i) acre(j,i) fyld(j,i)}{\sum_{i=1}^{N(j)} share(j,i) acre(j,i)}.$$

Whole-farm unit

The farmer selects a coverage level of 65%, 70%, 75%, 80%, or 85%. The value for the per-acre revenue guarantee (rounded to the nearest cent) is then calculated. If less than the maximum number of crops are insured in the whole-farm unit (because a farmer does not plant a covered crop in a county) then the summations are done only over the included crops.

$$(3) \quad revwf(j,i) = coverwf \left[\sum_j \frac{chip(j) \sum_{i=1}^{N(j)} share(j,i) acre(j,i) fyld(j,i)}{\sum_j \sum_{i=1}^{N(j)} share(j,i) acre(j,i)} \right]$$

4. Basic Unit Premiums

For each basic (or optional) unit the farmer supplies the state and county where the insured crops reside and values for *fyld* and *cover*. In addition, the farmer decides whether or not to choose the harvest price option (M13 rectype 11, RA Fall Harvest Price option, field 51, pos. 309). The state, county and whether the farmer chooses the harvest price option identifies which set of rating coefficients to use in equation (5). All single crop rating coefficients can be found in an Excel spreadsheet that accompanies this document. The counties that should be allocated to Southern Minnesota, Northern Minnesota are given in the appendix

The program should provide (or, alternatively, the user should supply) *yldREF* and *rateou*. *YldREF* is found on the FCI-35 page for RA. *rateou* is calculated using the steps used to calculate base premium rates for an optional unit under the APH program. These values must be allowed to vary by type and practice to account for the situation where a basic unit has more than one type of practice. The per-acre base premiums are then calculated using long, but straightforward, formulas.

The optional unit rate must first be multiplied by 0.9 as in equation (4) to determine *rate(j,i)*. The result is rounded to eight digits.

$$(4) \quad rate(j,i) = 0.9 \cdot rateou(j,i), \quad i = 1, \dots, N(j)$$

Base premium rate

(5)

$$\begin{aligned} premr(j,i) = & beta(j,0) + beta(j,1)rate(j,i) + beta(j,2)rate(j,i)^2 + beta(j,3)cover(j,i) \\ & beta(j,4)cover(j)^2 + beta(j,5)\frac{fyld(j,i)}{yld(REF(j))} + beta(j,6)\left(\frac{fyld(j,i)}{yld(REF(j))}\right)^2 \\ & beta(j,7)cvp(j) + beta(j,8)cvp(j)^2 + beta(j,9)rate(j,i) \cdot cover \\ & beta(j,10)rate(j,i) \cdot \frac{fyld(j,i)}{yld(REF(j))} + beta(j,11)rate(j,i) \cdot cvp(j) \\ & beta(j,12)cover \cdot \frac{fyld(j,i)}{yld(REF(j))} + beta(j,13)cover(j) \cdot cvp(j) \\ & beta(j,14)cvp(j) \cdot \frac{fyld(j,i)}{yld(REF(j))}, \quad i = 1, \dots, N(j). \end{aligned}$$

This formula is used to calculate the base premium rate for each basic unit and for each option unit for each crop.

Each individual calculation is rounded to 9 digits to the right of the decimal, and the variable *premr* is rounded to 4 digits.

The next step is to add a prevented planting load to these base premiums and to find the per-acre premiums.

NOTE – In the case of a written agreement, use the written agreement rate in place of *rateou* in equation (4).

Loaded per-acre premiums

The base premium rates are increased for prevented planting coverage if the farmer opts for 65% or 70% prevented planting coverage. It is also multiplied by the short-rate factor. The per-acre premium is found by multiplying the premium rate by liability and rounding to two decimals. An additional adjustment may be made when a short rate factor exists or when the canola CR factor exists. Use the short rate factor *srfctr(j,i)* as defined by the Risk Management Agency or the *crfctr(cn,i)*. Refer to the Actuarial Data Master Rate Factor File - Record 2 for the corresponding residual factor. For clarification, for corn and soybeans if the harvest price option is not selected, then all residual factors equal 1.0.

At base prevented planting

(6)

$$LP(j,i) = premr(j,i) \cdot revb(j,i) \cdot srfctr(j,i) \cdot crfctr(cn,i) \cdot residfctr(j,i)$$

At +5% prevented planting

(7)

$$LP(j,i) = premr(j,i) \cdot PP5(j) \cdot revb(j,i) \cdot srfctr(j,i) \cdot crfctr(cn,i) \cdot residfctr(j,i)$$

At +10% prevented planting

(8)

$$LP(j,i) = premr(j,i) \cdot PP10(j) \cdot revb(j,i) \cdot srfctr(j,i) \cdot crfctr(cn,i) \cdot residfctr(j,i)$$

Total basic unit premiums

The total premium for a basic unit is given by the equation (9). The premium is rounded to the nearest whole-dollar amount.

(9)

$$TLP(j,i) = LP(j,i) \cdot acre(j,i) \cdot share(j,i), \quad i = 1, \dots, N(j).$$

Total optional unit premium

The per-acre premium for an optional unit is found by treating the optional unit as a basic unit and then applying a 10% surcharge for all crops. This 10% surcharge applies to all RA crops. They are rounded to the nearest whole-dollar amount.

(10)

$$TLP(j,i) = 1.1LP(j,i) \cdot acre(j,i) \cdot share(j,i), \quad i = 1, \dots, N(j).$$

5. Enterprise Unit Premiums

The premium for an enterprise unit is found by using the same coefficients that are used to find premiums for basic or optional units. Differences in the rating equations arise if a farmer has more than one basic unit or farms in more than one section of land. These two factors change the approved farm yield and APH rate used in the equations.

Before the premiums can be calculated, *avgrate*, and *efyld* must be calculated. These quantities are simply the acreage and share weighted average of the APH yields and APH premium rates for all units of a crop in a county.

$$(11) \quad avgrate(j) = \frac{\sum_{i=1}^{N(j)} share(j,i)acre(j,i)rate(j,i)}{\sum_{i=1}^{N(j)} share(j,i)acre(j,i)}$$

$$(12) \quad eyld(j) = \frac{\sum_{i=1}^{N(j)} share(j,i)acre(j,i)fyld(j,i)}{\sum_{i=1}^{N(j)} share(j,i)acre(j,i)}$$

avgrate is rounded to 9 digits to the right of the decimal. *eyld* is rounded to one digit to the right of the decimal.

We then need to adjust *avgrate* to reflect the number of sections in the enterprise unit.

$$erate(c) = avgrate(c) \cdot (1 - (nsect(c) - 1) \frac{0.4}{9}) \quad \text{if } nsect(c) \leq 10,$$

$$\text{else } erate(c) = 0.6avgrate(c)$$

$$erate(j) = avgrate(j) \cdot (1 - (nsect(j) - 1) \frac{0.5}{9}) \quad \text{if } nsect(j) \leq 10,$$

$$\text{else } erate(j) = 0.5avgrate(j) \quad j = s, w, cn, sf, b, ww, ct, r.$$

erate is rounded to 4 digits.

And finally, if a farmer has multiple practices across within or between units then the values for *yldREF* to be used in equation (13) is the maximum applicable value.

Base premium rate for enterprise unit

(13)

$$\begin{aligned}
 epremr(j) = & beta(j,0) + beta(j,1)erate(j,i) + beta(j,2)erate(j,i)^2 + beta(j,3)ecover(j,i) \\
 & + beta(j,4)ecover(j)^2 + beta(j,5)\frac{efyld(j)}{yldREF(j)} + beta(j,6)\left(\frac{efyld(j)}{yldREF(j)}\right)^2 \\
 & + beta(j,7)cvp(j) + beta(j,8)cvp(j)^2 + beta(j,9)erate(j,i) \cdot ecover \\
 & + beta(j,10)erate(j,i) \cdot \frac{efyld(j)}{yldREF(j)} + beta(j,11)erate(j,i) \cdot cvp(j) \\
 & + beta(j,12)ecover \cdot \frac{efyld(j)}{yldREF(j)} + beta(j,13)ecover(j) \cdot cvp(j) \\
 & + beta(j,14)cvp(j) \cdot \frac{efyld(j)}{yldREF(j)}.
 \end{aligned}$$

Each individual calculation is rounded to 9 digits. $epremr$ is rounded to 4 digits.

Per-acre enterprise unit premiums

The next step is to convert the equation (13) rate into a per-acre base premium. This is done by multiplying the rate by the appropriate prevented planting factor and by liability (the per-acre revenue guarantee for enterprise units) and rounding to two digits. An additional adjustment may be made when a short rate factor exists or when the canola CR factor exists. Use the short rate factor $srfctr(j,i)$ as defined by the Risk Management Agency or the $crfctr(cn,i)$.

At base prevented planting

$$(14) \quad LEP(j,i) = epremr(j) \cdot reve(j,i) \cdot srfctr(j,i) \cdot crfctr(cn,i)$$

At +5% prevented planting

$$(15) \quad LEP(j,i) = epremr(j,i) \cdot PP5(j) \cdot reve(j,i) \cdot srfctr(j,i) \cdot crfctr(cn,i)$$

At +10% prevented planting

$$\begin{aligned}
 (16) \quad LEP(j,i) = & epremr(j,i) \cdot PP10(j) \cdot reve(j,i) \cdot srfctr(j,i) \cdot crfctr(cn,i)
 \end{aligned}$$

Total loaded enterprise premiums

Now we need to multiply the loaded per-acre premium by the number of insured acres and share on the each unit. The result will be rounded to whole-dollars. The total

enterprise premium is found by summing over all units. This will be rounded on a record by record basis (M13 ,rectype 11, field 56, total premium, pos 346).

$$(17) \quad TLEP(j) = \sum_{i=1}^{N(j)} \text{round}(LEP(j) \cdot acre(j,i) \cdot share(j,i), 0).$$

6. Whole-Farm Unit Premium

Calculation of whole-farm premium follows the same procedure as calculation of premium for the other unit structures. However, because there are up to six crops involved, the equations for whole-farm premiums are significantly longer. To facilitate programming, the rating coefficients and rating factors (variables) that are multiplied together and then added to come up with the whole-farm premium are presented as columns below.

The values for the coefficients in **betawf** and **betawfla** depend on which crops are in the whole-farm unit and on whether the farmer chooses the harvest price option. Thus, a state that has corn, soybeans, and wheat eligible for whole-farm RA coverage will have eight sets of coefficients: two for a corn-soybean whole-farm unit, two for a corn-wheat whole-farm unit, two for a soybean-wheat whole-farm unit, and two for a corn-soybean-wheat whole-farm unit. There are eight sets each for Iowa, Southern Minnesota, Northern Minnesota, Oklahoma, Eastern South Dakota, Western South Dakota, and Idaho. There are two sets of coefficients for states with two crops eligible for whole-farm RA coverage, which includes Colorado, Illinois, Indiana, Kansas, Kentucky, Louisiana, Michigan, Missouri, Ohio, and Tennessee. For North Dakota, which has six crops eligible for RA coverage, there are a total of 114 sets of whole-farm rating coefficients. For Arkansas, which has four crops eligible for RA coverage, there are a total of 16 sets of whole-farm rating coefficients.

The sets of whole-farm coefficients are given in an Excel spreadsheet that accompanies these programming instructions.

There are six additional rating factors used to calculate whole-farm rates. These are *perlia(j)*, which is calculated as

$$(18) \quad perlia(j) = \frac{\sum_{i=1}^{N(j)} chip(j) fylld(j,i) acre(j,i) share(j,i)}{\sum_{j=1}^{6(\text{or } 4)} \sum_{i=1}^{N(j)} chip(j) fylld(j,i) acre(j,i) share(j,i)}$$

perlia should be rounded to four digits. If a crop is not grown, then set all *acre(j,i)* for that crop equal to zero in equation (18).

Whole-farm base premium rate

Table 1. Whole-farm rating coefficients and rating factors (variables) for all states other than Arkansas, Louisiana, and Oklahoma.

<u>Coefficient</u>	<u>Variable</u>
betawf(0)	1
betawf(1)	erate(c)
betawf(2)	erate(s)
betawf(3)	erate(w)
betawf(4)	erate(cn)
betawf(5)	erate(sf)
betawf(6)	erate(b)
betawf(7)	erate(c) ²
betawf(8)	erate(s) ²
betawf(9)	erate(w) ²
betawf(10)	erate(cn) ²
betawf(11)	erate(sf) ²
betawf(12)	erate(b) ²
betawf(13)	erate(c) x erate(s)
betawf(14)	erate(c) x erate(w)
betawf(15)	erate(c) x erate(cn)
betawf(16)	erate(c) x erate(sf)
betawf(17)	erate(c) x erate(b)
betawf(18)	erate(s) x erate(w)
betawf(19)	erate(s) x erate(cn)
betawf(20)	erate(s) x erate(sf)
betawf(21)	erate(s) x erate(b)
betawf(22)	erate(w) x erate(cn)
betawf(23)	erate(w) x erate(sf)
betawf(24)	erate(w) x erate(b)
betawf(25)	erate(cn) x erate(sf)
betawf(26)	erate(cn) x erate(b)
betawf(27)	erate(sf) x erate(b)
betawf(28)	covwf
betawf(29)	covwf ²
betawf(30)	covwf x erate(c)
betawf(31)	covwf x erate(s)
betawf(32)	covwf x erate(w)

betawf(33)	covwf x erate(cn)
betawf(34)	covwf x erate(sf)
betawf(35)	covwf x erate(b)
betawf(36)	perlia(c)
betawf(37)	perlia(s)
betawf(38)	perlia(w)
betawf(39)	perlia(cn)
betawf(40)	perlia(sf)
betawf(41)	perlia(b)
betawf(42)	perlia(c) ²
betawf(43)	perlia(s) ²
betawf(44)	perlia(w) ²
betawf(45)	perlia(cn) ²
betawf(46)	perlia(sf) ²
betawf(47)	perlia(b) ²
betawf(48)	perlia(c) ³
betawf(49)	perlia(s) ³
betawf(50)	perlia(w) ³
betawf(51)	perlia(cn) ³
betawf(52)	perlia(sf) ³
betawf(53)	perlia(b) ³
betawf(54)	perlia(c) x erate(c)
betawf(55)	perlia(c) x erate(s)
betawf(56)	perlia(c) x erate(w)
betawf(57)	perlia(c) x erate(cn)
betawf(58)	perlia(c) x erate(sf)
betawf(59)	perlia(c) x erate(b)
betawf(60)	perlia(s) x erate(c)
betawf(61)	perlia(s) x erate(s)
betawf(62)	perlia(s) x erate(w)
betawf(63)	perlia(s) x erate(cn)
betawf(64)	perlia(s) x erate(sf)
betawf(65)	perlia(s) x erate(b)
betawf(66)	perlia(w) x erate(c)
betawf(67)	perlia(w) x erate(s)
betawf(68)	perlia(w) x erate(w)
betawf(69)	perlia(w) x erate(cn)
betawf(70)	perlia(w) x erate(sf)
betawf(71)	perlia(w) x erate(b)

betawf(72)	perlia(cn) x erate(c)
betawf(73)	perlia(cn) x erate(s)
betawf(74)	perlia(cn) x erate(w)
betawf(75)	perlia(cn) x erate(cn)
betawf(76)	perlia(cn) x erate(sf)
betawf(77)	perlia(cn) x erate(b)
betawf(78)	perlia(sf) x erate(c)
betawf(79)	perlia(sf) x erate(s)
betawf(80)	perlia(sf) x erate(w)
betawf(81)	perlia(sf) x erate(cn)
betawf(82)	perlia(sf) x erate(sf)
betawf(83)	perlia(sf) x erate(b)
betawf(84)	perlia(b) x erate(c)
betawf(85)	perlia(b) x erate(s)
betawf(86)	perlia(b) x erate(w)
betawf(87)	perlia(b) x erate(cn)
betawf(88)	perlia(b) x erate(sf)
betawf(89)	perlia(b) x erate(b)
betawf(90)	perlia(c) ² x erate(c)
betawf(91)	perlia(c) ² x erate(s)
betawf(92)	perlia(c) ² x erate(w)
betawf(93)	perlia(c) ² x erate(cn)
betawf(94)	perlia(c) ² x erate(sf)
betawf(95)	perlia(c) ² x erate(b)
betawf(96)	perlia(s) ² x erate(c)
betawf(97)	perlia(s) ² x erate(s)
betawf(98)	perlia(s) ² x erate(w)
betawf(99)	perlia(s) ² x erate(cn)
betawf(100)	perlia(s) ² x erate(sf)
betawf(101)	perlia(s) ² x erate(b)
betawf(102)	perlia(w) ² x erate(c)
betawf(103)	perlia(w) ² x erate(s)
betawf(104)	perlia(w) ² x erate(w)
betawf(105)	perlia(w) ² x erate(cn)
betawf(106)	perlia(w) ² x erate(sf)
betawf(107)	perlia(w) ² x erate(b)
betawf(108)	perlia(cn) ² x erate(c)
betawf(109)	perlia(cn) ² x erate(s)
betawf(110)	perlia(cn) ² x erate(w)

betawf(111)	perlia(cn) ² x erate(cn)
betawf(112)	perlia(cn) ² x erate(sf)
betawf(113)	perlia(cn) ² x erate(b)
betawf(114)	perlia(sf) ² x erate(c)
betawf(115)	perlia(sf) ² x erate(s)
betawf(116)	perlia(sf) ² x erate(w)
betawf(117)	perlia(sf) ² x erate(cn)
betawf(118)	perlia(sf) ² x erate(sf)
betawf(119)	perlia(sf) ² x erate(b)
betawf(120)	perlia(b) ² x erate(c)
betawf(121)	perlia(b) ² x erate(s)
betawf(122)	perlia(b) ² x erate(w)
betawf(123)	perlia(b) ² x erate(cn)
betawf(124)	perlia(b) ² x erate(sf)
betawf(125)	perlia(b) ² x erate(b)
betawf(126)	perlia(c) ² x covwf
betawf(127)	perlia(s) ² x covwf
betawf(128)	perlia(w) ² x covwf
betawf(129)	perlia(cn) ² x covwf
betawf(130)	perlia(sf) ² x covwf
betawf(131)	perlia(b) ² x covwf
betawf(132)	perlia(c) ³ x covwf
betawf(133)	perlia(s) ³ x covwf
betawf(134)	perlia(w) ³ x covwf
betawf(135)	perlia(cn) ³ x covwf
betawf(136)	perlia(sf) ³ x covwf
betawf(137)	perlia(b) ³ x covwf
betawf(138)	efyld(c)/yldREF(c)
betawf(139)	efyld(s)/yldREF(s)
betawf(140)	efyld(w)/yldREF(w)
betawf(141)	efyld(cn)/yldREF(cn)
betawf(142)	efyld(sf)/yldREF(sf)
betawf(143)	efyld(b)/yldREF(b)
betawf(144)	(efyld(c)/yldREF(c)) ²
betawf(145)	(efyld(s)/yldREF(s)) ²
betawf(146)	(efyld(w)/yldREF(w)) ²
betawf(147)	(efyld(cn)/yldREF(cn)) ²
betawf(148)	(efyld(sf)/yldREF(sf)) ²
betawf(149)	(efyld(b)/yldREF(b)) ²

betawf(150)	perlia(c)/perlia(s)
betawf(151)	perlia(c)/perlia(w)
betawf(152)	perlia(c)/perlia(cn)
betawf(153)	perlia(c)/perlia(sf)
betawf(154)	perlia(c)/perlia(b)
betawf(155)	perlia(s)/perlia(w)
betawf(156)	perlia(s)/perlia(cn)
betawf(157)	perlia(s)/perlia(sf)
betawf(158)	perlia(s)/perlia(b)
betawf(159)	perlia(w)/perlia(cn)
betawf(160)	perlia(w)/perlia(sf)
betawf(161)	perlia(w)/perlia(b)
betawf(162)	perlia(cn)/perlia(sf)
betawf(163)	perlia(cn)/perlia(b)
betawf(164)	perlia(sf)/perlia(b)
betawf(165)	(perlia(c)/perlia(s)) ²
betawf(166)	((perlia(c)/perlia(w)) ²
betawf(167)	(perlia(c)/perlia(cn)) ²
betawf(168)	(perlia(c)/perlia(sf)) ²
betawf(169)	(perlia(c)/perlia(b)) ²
betawf(170)	(perlia(s)/perlia(w)) ²
betawf(171)	(perlia(s)/perlia(cn)) ²
betawf(172)	(perlia(s)/perlia(sf)) ²
betawf(173)	(perlia(s)/perlia(b)) ²
betawf(174)	(perlia(w)/perlia(cn)) ²
betawf(175)	(perlia(w)/perlia(sf)) ²
betawf(176)	(perlia(w)/perlia(b)) ²
betawf(177)	(perlia(cn)/perlia(sf)) ²
betawf(178)	(perlia(cn)/perlia(b)) ²
betawf(179)	(perlia(sf)/perlia(b)) ²
betawf(180)	cvp(c)
betawf(181)	cvp(s)
betawf(182)	cvp(w)
betawf(183)	cvp(cn)
betawf(184)	cvp(sf)
betawf(185)	cvp(b)
betawf(186)	cvp(c) ²
betawf(187)	cvp(s) ²
betawf(188)	cvp(w) ²

betawf(189)	cvp(cn) ²
betawf(190)	cvp(sf) ²
betawf(191)	cvp(b) ²
betawf(192)	cvp(c) x erate(c)
betawf(193)	cvp(c) x erate(s)
betawf(194)	cvp(c) x erate(w)
betawf(195)	cvp(c) x erate(cn)
betawf(196)	cvp(c) x erate(sf)
betawf(197)	cvp(c) x erate(b)
betawf(198)	cvp(s) x erate(c)
betawf(199)	cvp(s) x erate(s)
betawf(200)	cvp(s) x erate(w)
betawf(201)	cvp(s) x erate(cn)
betawf(202)	cvp(s) x erate(sf)
betawf(203)	cvp(s) x erate(b)
betawf(204)	cvp(w) x erate(c)
betawf(205)	cvp(w) x erate(s)
betawf(206)	cvp(w) x erate(w)
betawf(207)	cvp(w) x erate(cn)
betawf(208)	cvp(w) x erate(sf)
betawf(209)	cvp(w) x erate(b)
betawf(210)	cvp(cn) x erate(c)
betawf(211)	cvp(cn) x erate(s)
betawf(212)	cvp(cn) x erate(w)
betawf(213)	cvp(cn) x erate(cn)
betawf(214)	cvp(cn) x erate(sf)
betawf(215)	cvp(cn) x erate(b)
betawf(216)	cvp(sf) x erate(c)
betawf(217)	cvp(sf) x erate(s)
betawf(218)	cvp(sf) x erate(w)
betawf(219)	cvp(sf) x erate(cn)
betawf(220)	cvp(sf) x erate(sf)
betawf(221)	cvp(sf) x erate(b)
betawf(222)	cvp(b) x erate(c)
betawf(223)	cvp(b) x erate(s)
betawf(224)	cvp(b) x erate(w)
betawf(225)	cvp(b) x erate(cn)
betawf(226)	cvp(b) x erate(sf)
betawf(227)	cvp(b) x erate(b)

betawf(228)	$cvp(c)^2 \times erate(c)$
betawf(229)	$cvp(c)^2 \times erate(s)$
betawf(230)	$cvp(c)^2 \times erate(w)$
betawf(231)	$cvp(c)^2 \times erate(cn)$
betawf(232)	$cvp(c)^2 \times erate(sf)$
betawf(233)	$cvp(c)^2 \times erate(b)$
betawf(234)	$cvp(s)^2 \times erate(c)$
betawf(235)	$cvp(s)^2 \times erate(s)$
betawf(236)	$cvp(s)^2 \times erate(w)$
betawf(237)	$cvp(s)^2 \times erate(cn)$
betawf(238)	$cvp(s)^2 \times erate(sf)$
betawf(239)	$cvp(s)^2 \times erate(b)$
betawf(240)	$cvp(w)^2 \times erate(c)$
betawf(241)	$cvp(w)^2 \times erate(s)$
betawf(242)	$cvp(w)^2 \times erate(w)$
betawf(243)	$cvp(w)^2 \times erate(cn)$
betawf(244)	$cvp(w)^2 \times erate(sf)$
betawf(245)	$cvp(w)^2 \times erate(b)$
betawf(246)	$cvp(cn)^2 \times erate(c)$
betawf(247)	$cvp(cn)^2 \times erate(s)$
betawf(248)	$cvp(cn)^2 \times erate(w)$
betawf(249)	$cvp(cn)^2 \times erate(cn)$
betawf(250)	$cvp(cn)^2 \times erate(sf)$
betawf(251)	$cvp(cn)^2 \times erate(b)$
betawf(252)	$cvp(sf)^2 \times erate(c)$
betawf(253)	$cvp(sf)^2 \times erate(s)$
betawf(254)	$cvp(sf)^2 \times erate(w)$
betawf(255)	$cvp(sf)^2 \times erate(cn)$
betawf(256)	$cvp(sf)^2 \times erate(sf)$
betawf(257)	$cvp(sf)^2 \times erate(b)$
betawf(258)	$cvp(b)^2 \times erate(c)$
betawf(259)	$cvp(b)^2 \times erate(s)$
betawf(260)	$cvp(b)^2 \times erate(w)$
betawf(261)	$cvp(b)^2 \times erate(cn)$
betawf(262)	$cvp(b)^2 \times erate(sf)$
betawf(263)	$cvp(b)^2 \times erate(b)$
betawf(264)	$perlia(c) \times cvp(c)$
betawf(265)	$perlia(c) \times cvp(s)$
betawf(266)	$perlia(c) \times cvp(w)$

betawf(267)	perlia(c) x cvp(cn)
betawf(268)	perlia(c) x cvp(sf)
betawf(269)	perlia(c) x cvp(b)
betawf(270)	perlia(s) x cvp(c)
betawf(271)	perlia(s) x cvp(s)
betawf(272)	perlia(s) x cvp(w)
betawf(273)	perlia(s) x cvp(cn)
betawf(274)	perlia(s) x cvp(sf)
betawf(275)	perlia(s) x cvp(b)
betawf(276)	perlia(w) x cvp(c)
betawf(277)	perlia(w) x cvp(s)
betawf(278)	perlia(w) x cvp(w)
betawf(279)	perlia(w) x cvp(cn)
betawf(280)	perlia(w) x cvp(sf)
betawf(281)	perlia(w) x cvp(b)
betawf(282)	perlia(cn) x cvp(c)
betawf(283)	perlia(cn) x cvp(s)
betawf(284)	perlia(cn) x cvp(w)
betawf(285)	perlia(cn) x cvp(cn)
betawf(286)	perlia(cn) x cvp(sf)
betawf(287)	perlia(cn) x cvp(b)
betawf(288)	perlia(sf) x cvp(c)
betawf(289)	perlia(sf) x cvp(s)
betawf(290)	perlia(sf) x cvp(w)
betawf(291)	perlia(sf) x cvp(cn)
betawf(292)	perlia(sf) x cvp(sf)
betawf(293)	perlia(sf) x cvp(b)
betawf(294)	perlia(c) ² x cvp(c)
betawf(295)	perlia(c) ² x cvp(s)
betawf(296)	perlia(c) ² x cvp(w)
betawf(297)	perlia(c) ² x cvp(cn)
betawf(298)	perlia(c) ² x cvp(sf)
betawf(299)	perlia(c) ² x cvp(b)
betawf(300)	perlia(s) ² x cvp(c)
betawf(301)	perlia(s) ² x cvp(s)
betawf(302)	perlia(s) ² x cvp(w)
betawf(303)	perlia(s) ² x cvp(cn)
betawf(304)	perlia(s) ² x cvp(sf)
betawf(305)	perlia(s) ² x cvp(b)

betawf(306)	perlia(w) ² x cvp(c)
betawf(307)	perlia(w) ² x cvp(s)
betawf(308)	perlia(w) ² x cvp(w)
betawf(309)	perlia(w) ² x cvp(cn)
betawf(310)	perlia(w) ² x cvp(sf)
betawf(311)	perlia(w) ² x cvp(b)
betawf(312)	perlia(cn) ² x cvp(c)
betawf(313)	perlia(cn) ² x cvp(s)
betawf(314)	perlia(cn) ² x cvp(w)
betawf(315)	perlia(cn) ² x cvp(cn)
betawf(316)	perlia(cn) ² x cvp(sf)
betawf(317)	perlia(cn) ² x cvp(b)
betawf(318)	perlia(sf) ² x cvp(c)
betawf(319)	perlia(sf) ² x cvp(s)
betawf(320)	perlia(sf) ² x cvp(w)
betawf(321)	perlia(sf) ² x cvp(cn)
betawf(322)	perlia(sf) ² x cvp(sf)
betawf(323)	perlia(sf) ² x cvp(b)
betawf(324)	perlia(b) ² x cvp(c)
betawf(325)	perlia(b) ² x cvp(s)
betawf(326)	perlia(b) ² x cvp(w)
betawf(327)	perlia(b) ² x cvp(cn)
betawf(328)	perlia(b) ² x cvp(sf)
betawf(329)	perlia(b) ² x cvp(b)

Table 2. Whole-farm rating coefficients and rating factors (variables) for Arkansas and Louisiana, and Oklahoma.

<u>Coefficient</u>	<u>Variable</u>
betawfla(0)	1
betawfla(1)	erate(c)
betawfla(2)	erate(s)
betawfla(3)	erate(ct)
betawfla(4)	erate(r)
betawfla(5)	erate(c) ²
betawfla(6)	erate(s) ²
betawfla(7)	erate(ct) ²
betawfla(8)	erate(r) ²

betawfla(9)	erate(c) x erate(s)
betawfla(10)	erate(c) x erate(ct)
betawfla(11)	erate(c) x erate(r)
betawfla(12)	erate(s) x erate(ct)
betawfla(13)	erate(s) x erate(r)
betawfla(14)	erate(ct) x erate(r)
betawfla(15)	covwf
betawfla(16)	covwf ²
betawfla(17)	covwf x erate(c)
betawfla(18)	covwf x erate(s)
betawfla(19)	covwf x erate(ct)
betawfla(20)	covwf x erate(r)
betawfla(21)	perlia(c)
betawfla(22)	perlia(s)
betawfla(23)	perlia(ct)
betawfla(24)	perlia(r)
betawfla(25)	perlia(c) ²
betawfla(26)	perlia(s) ²
betawfla(27)	perlia(ct) ²
betawfla(28)	perlia(r) ²
betawfla(29)	perlia(c) ³
betawfla(30)	perlia(s) ³
betawfla(31)	perlia(ct) ³
betawfla(32)	perlia(r) ³
betawfla(33)	perlia(c) x erate(c)
betawfla(34)	perlia(c) x erate(s)
betawfla(35)	perlia(c) x erate(ct)
betawfla(36)	perlia(c) x erate(r)
betawfla(37)	perlia(s) x erate(c)
betawfla(38)	perlia(s) x erate(s)
betawfla(39)	perlia(s) x erate(ct)
betawfla(40)	perlia(s) x erate(r)
betawfla(41)	perlia(ct) x erate(c)
betawfla(42)	perlia(ct) x erate(s)
betawfla(43)	perlia(ct) x erate(ct)
betawfla(44)	perlia(ct) x erate(r)
betawfla(45)	perlia(r) x erate(c)
betawfla(46)	perlia(r) x erate(s)
betawfla(47)	perlia(r) x erate(ct)

betawfla(48)	perlia(r) x erate(r)
betawfla(49)	perlia(c) ² x erate(c)
betawfla(50)	perlia(c) ² x erate(s)
betawfla(51)	perlia(c) ² x erate(ct)
betawfla(52)	perlia(c) ² x erate(r)
betawfla(53)	perlia(s) ² x erate(c)
betawfla(54)	perlia(s) ² x erate(s)
betawfla(55)	perlia(s) ² x erate(ct)
betawfla(56)	perlia(s) ² x erate(r)
betawfla(57)	perlia(ct) ² x erate(c)
betawfla(58)	perlia(ct) ² x erate(s)
betawfla(59)	perlia(ct) ² x erate(ct)
betawfla(60)	perlia(ct) ² x erate(r)
betawfla(61)	perlia(r) ² x erate(c)
betawfla(62)	perlia(r) ² x erate(s)
betawfla(63)	perlia(r) ² x erate(ct)
betawfla(64)	perlia(r) ² x erate(r)
betawfla(65)	perlia(c) ² x covwf
betawfla(66)	perlia(s) ² x covwf
betawfla(67)	perlia(ct) ² x covwf
betawfla(68)	perlia(r) ² x covwf
betawfla(69)	perlia(c) ³ x covwf
betawfla(70)	perlia(s) ³ x covwf
betawfla(71)	perlia(ct) ³ x covwf
betawfla(72)	perlia(r) ³ x covwf
betawfla(73)	efyld(c)/yldREF(c)
betawfla(74)	efyld(s)/yldREF(s)
betawfla(75)	efyld(ct)/yldREF(ct)
betawfla(76)	efyld(r)/yldREF(r)
betawfla(77)	(efyld(c)/yldREF(c)) ²
betawfla(78)	(efyld(s)/yldREF(s)) ²
betawfla(79)	(efyld(ct)/yldREF(ct)) ²
betawfla(80)	(efyld(r)/yldREF(r)) ²
betawfla(81)	perlia(c)/perlia(s)
betawfla(82)	perlia(c)/perlia(ct)
betawfla(83)	perlia(c)/perlia(r)
betawfla(84)	perlia(s)/perlia(ct)
betawfla(85)	perlia(s)/perlia(r)
betawfla(86)	perlia(ct)/perlia(r)

betawfla(87)	$(\text{perlia}(c)/\text{perlia}(s))^2$
betawfla(88)	$((\text{perlia}(c)/\text{perlia}(ct))^2$
betawfla(89)	$(\text{perlia}(c)/\text{perlia}(r))^2$
betawfla(90)	$(\text{perlia}(s)/\text{perlia}(ct))^2$
betawfla(91)	$(\text{perlia}(s)/\text{perlia}(r))^2$
betawfla(92)	$(\text{perlia}(ct)/\text{perlia}(r))^2$
betawfla(93)	$\text{cvp}(c)$
betawfla(94)	$\text{cvp}(s)$
betawfla(95)	$\text{cvp}(ct)$
betawfla(96)	$\text{cvp}(r)$
betawfla(97)	$\text{cvp}(c)^2$
betawfla(98)	$\text{cvp}(s)^2$
betawfla(99)	$\text{cvp}(ct)^2$
betawfla(100)	$\text{cvp}(r)^2$
betawfla(101)	$\text{cvp}(c) \times \text{erate}(c)$
betawfla(102)	$\text{cvp}(c) \times \text{erate}(s)$
betawfla(103)	$\text{cvp}(c) \times \text{erate}(ct)$
betawfla(104)	$\text{cvp}(c) \times \text{erate}(r)$
betawfla(105)	$\text{cvp}(s) \times \text{erate}(c)$
betawfla(106)	$\text{cvp}(s) \times \text{erate}(s)$
betawfla(107)	$\text{cvp}(s) \times \text{erate}(ct)$
betawfla(108)	$\text{cvp}(s) \times \text{erate}(r)$
betawfla(109)	$\text{cvp}(ct) \times \text{erate}(c)$
betawfla(110)	$\text{cvp}(ct) \times \text{erate}(s)$
betawfla(111)	$\text{cvp}(ct) \times \text{erate}(ct)$
betawfla(112)	$\text{cvp}(ct) \times \text{erate}(r)$
betawfla(113)	$\text{cvp}(r) \times \text{erate}(c)$
betawfla(114)	$\text{cvp}(r) \times \text{erate}(s)$
betawfla(115)	$\text{cvp}(r) \times \text{erate}(ct)$
betawfla(116)	$\text{cvp}(r) \times \text{erate}(r)$
betawfla(117)	$\text{cvp}(c)^2 \times \text{erate}(c)$
betawfla(118)	$\text{cvp}(c)^2 \times \text{erate}(s)$
betawfla(119)	$\text{cvp}(c)^2 \times \text{erate}(ct)$
betawfla(120)	$\text{cvp}(c)^2 \times \text{erate}(r)$
betawfla(121)	$\text{cvp}(s)^2 \times \text{erate}(c)$
betawfla(122)	$\text{cvp}(s)^2 \times \text{erate}(s)$
betawfla(123)	$\text{cvp}(s)^2 \times \text{erate}(ct)$
betawfla(124)	$\text{cvp}(s)^2 \times \text{erate}(r)$
betawfla(125)	$\text{cvp}(ct)^2 \times \text{erate}(c)$

The whole-farm premium rate (*wfpremr*) is found by multiplying each coefficient by the corresponding value of the variable and then summing the results. Each individual calculation should be rounded to 9 digits. The sum should be rounded to 4 digits. If a crop is not used, care must be taken to avoid divide-by-zero errors in the rating variables.

Checking to See if Maximum Whole-Farm Discount is Exceeded

RA whole-farm premium rates cannot be less than *minratefactor* times the average premium rate had the producer bought enterprise unit coverage, where *minratefactor* = 0.5, if two crops are included in the whole-farm unit; = 0.475 if three crops; = 0.45 if four crops; = 0.425 if five crops; and 0.4 if six crops are included. To determine if this limit has been exceeded we need to use the whole-farm coverage level, *covwf*, in the enterprise unit premium equations for the crops in the whole-farm unit. The enterprise equation with *covwf* is reproduced below. Each individual calculation is rounded to 9 digits, and the variable *epremwr(j)* is rounded to 4 digits.

(19)

$$\begin{aligned}
 \text{epremrw}(j) = & \text{beta}(j,0) + \text{beta}(j,1)\text{erate}(j,i) + \text{beta}(j,2)\text{erate}(j,i)^2 + \text{beta}(j,3)\text{covwf}(j,i) \\
 & \text{beta}(j,4)\text{covwf}(j)^2 + \text{beta}(j,5)\frac{\text{efyld}(j)}{\text{yld}(\text{REF}(j))} + \text{beta}(j,6)\left(\frac{\text{efyld}(j)}{\text{yld}(\text{REF}(j))}\right)^2 \\
 & \text{beta}(j,7)\text{cvp}(j) + \text{beta}(j,8)\text{cvp}(j)^2 + \text{beta}(j,9)\text{erate}(j,i) \cdot \text{covwf} \\
 & \text{beta}(j,10)\text{erate}(j,i) \cdot \frac{\text{efyld}(j)}{\text{yld}(\text{REF}(j))} + \text{beta}(j,11)\text{erate}(j,i) \cdot \text{cvp}(j) \\
 & \text{beta}(j,12)\text{covwf} \cdot \frac{\text{efyld}(j)}{\text{yld}(\text{REF}(j))} + \text{beta}(j,13)\text{covwf}(j) \cdot \text{cvp}(j) \\
 & \text{beta}(j,14)\text{cvp}(j) \cdot \frac{\text{efyld}(j)}{\text{yld}(\text{REF}(j))}.
 \end{aligned}$$

The next step is to take the weighted average of *epremrw* to determine if the maximum discount has been exceeded.

$$(20) \quad \text{wfpremre} = \frac{\sum_j^N (\sum_{i=1}^{N(j)} \text{round}(\text{epremrw}(j) \cdot \text{acre}(j,i) \cdot \text{share}(j,i), 0))}{\sum_j^N \sum_{i=1}^{N(j)} \text{acre}(j,i) \cdot \text{share}(j,i)}$$

Now set wfpremr equal to minratefactor times the weighted average of the enterprise unit premium rate if the maximum discount is exceeded. Otherwise do nothing. The product of minratefactor and wfpremrw is rounded to 4 digits before the comparison is done as follows:

$$(21) \quad wfpremr = \max[wfpremr, \text{round}(minratefactor} \cdot wfpremrw, 4)]$$

Per-acre whole-farm unit premiums

The next step is to add the prevented planting load. The resulting per-acre premium is rounded to two digits. The prevented planting load is the share- and acreage-weighted average of the prevented planting load for each crop. An additional adjustment may be made when a short rate factor exists. Use the short rate factor $srfctr(j)$ as defined by the Risk Management Agency.

At base prevented planting

$$(22) \quad LWFP(j, i) = wfpremr \cdot revwf \cdot srfctr(j, i) \cdot crfctr(cn, i)$$

At +5% prevented planting

$$(23) \quad LWFP(j, i) = wfpremr \cdot revwf \cdot srfctr(j, i) \cdot crfctr(cn, i) \cdot \frac{\sum_j PP5(j) \sum_{i=1}^{N(j)} acre(j, i) \cdot share(j, i)}{\sum_j \sum_{i=1}^{N(j)} acre(j, i) \cdot share(j, i)}$$

At +10% prevented planting

$$(24) \quad LWFP(j, i) = wfpremr \cdot revwf \cdot srfctr(j, i) \cdot crfctr(cn, i) \cdot \frac{\sum_j PP10(j) \sum_{i=1}^{N(j)} acre(j, i) \cdot share(j, i)}{\sum_j \sum_{i=1}^{N(j)} acre(j, i) \cdot share(j, i)}$$

Total whole-farm unit premiums

Total loaded whole-farm premium is then found by multiplying LWFP by insured acres and share on each unit (or record) and then summing up over all records. This will be rounded on a record by record basis (M13, rectype 11, field 56, total premium, pos 346).

$$(25) \quad TLWFP = \sum_j \sum_{i=1}^{N(j)} \text{round}(LWFP(j,i) \cdot acre(j,i) \cdot share(j,i), 0)$$

7. Premium Subsidy

RA premium subsidies are calculated by multiplying the total loaded premium by a premium subsidy factor. The premium subsidy factor varies by the coverage level percent. If the coverage level percent is equal to 0.65 or 0.70, then *subfact*, *subfacte*, and *subfactwf* (whichever is applicable) = 0.59. If the coverage level percent is equal to 0.75, then *subfact*, *subfacte*, and *subfactwf* (whichever is applicable) = 0.55. If the coverage level percent is equal to 0.80, then *subfact*, *subfacte*, and *subfactwf* (whichever is applicable) = 0.48. If the coverage level percent is equal to 0.85, then *subfact*, *subfacte*, and *subfactwf* (whichever is applicable) = 0.38

Optional and basic units

The RA premium subsidy equals the RA subsidy factor times the total loaded RA premium

$$(26) \quad psub(j,i) = \text{round}(subfact(j) \cdot TLP(j,i), 0)$$

Enterprise unit

The premium subsidy for RA enterprise units is calculated on a record by record basis and then summed. Note that the record premium needs to be rounded before it is multiplied by the RA premium subsidy factor.

$$(27) \quad psube(j) = \sum_{i=1}^{N(j)} \text{round}(subfacte(j) \cdot \text{round}(LEP(j) \cdot acre(j,i) \cdot share(j,i), 0), 0)$$

Whole-farm unit

The premium subsidy for RA whole-farm units is calculated on a record by record basis and then summed. Note that the record premium needs to be rounded before it is multiplied by the RA premium subsidy factor.

(28)

$$psubwf(j) = \sum_j \sum_{i=1}^{N(j)} \text{round}(subfactwf(j) \cdot \text{round}(LWFP(j) \cdot acre(j,i) \cdot share(j,i), 0), 0)$$

8. Producer Paid Premiums

The following equations are used to calculate producer paid premiums for each unit structure. Because both unsubsidized premiums and premium subsidies are rounded to whole-dollar amounts, there is no need to round producer paid premiums. The producer paid premiums are calculated on a record basis.

Optional and basic units

$$(29) \quad TLPsub(j,i) = TLP(j,i) - psub(j,i)$$

Enterprise unit

$$(30) \quad \begin{aligned} TLEPsub(j,i) = & \text{round}(LEP(j) \cdot acre(j,i) \cdot share(j,i), 0) - \\ & \text{round}(subfacte(j) \cdot \text{round}(LEP(j) \cdot acre(j,i) \cdot share(j,i), 0)) \end{aligned}$$

Whole-farm unit

$$(31) \quad \begin{aligned} TLWFPsub(j,i) = & \text{round}(LWFP(j) \cdot acre(j,i) \cdot share(j,i), 0) - \\ & \text{round}(subfactwf(j) \cdot \text{round}(LWFP(j) \cdot acre(j,i) \cdot share(j,i), 0)) \end{aligned}$$

Appendix A. Identification of Counties in Southern Minnesota and South Dakota

Minnesota counties that make up Southern Minnesota and South Dakota counties that make up Eastern South Dakota.

FIPS	Southern Minn	FIPS	E. South Dakota Counties
27011	Big Stone	46009	Bon Homme
27013	Blue Earth	46011	Brookings
27015	Brown	46027	Clay
27019	Carver	46029	Codington
27023	Chippewa	46035	Davison
27033	Cottonwood	46039	Deuel
27037	Dakota	46051	Grant
27039	Dodge	46057	Hamlin
27041	Douglas	46061	Hanson
27043	Faribault	46067	Hutchinson
27045	Fillmore	46077	Kingsbury
27047	Freeborn	46079	Lake
27049	Goodhue	46083	Lincoln
27051	Grant	46087	McCook
27053	Hennepin	46097	Miner
27055	Houston	46099	Minnehaha
27063	Jackson	46101	Moody
27067	Kandiyohi	46111	Sanborn
27073	Lac Qui Parle	46125	Turner
27079	Le Sueur	46127	Union
27081	Lincoln	46135	Yankton
27083	Lyon		
27085	McLeod		
27091	Martin		
27093	Meeker		
27099	Mower		
27101	Murray		
27103	Nicollet		
27105	Nobles		
27109	Olmsted		
27117	Pipestone		
27121	Pope		
27127	Redwood		
27129	Renville		
27131	Rice		
27133	Rock		
27139	Scott		

27143	Sibley
27145	Stearns
27147	Steele
27149	Stevens
27151	Swift
27155	Traverse
27157	Wabasha
27161	Waseca
27165	Watonwan
27169	Winona
27171	Wright
27173	Yellow Medicine

Appendix B. Premium Calculation for RA Malting Barley Endorsement

Revenue Assurance Malting Barley Endorsement Premium Worked Example

November 3, 2002

MBacre = reported acres, field 34, pos. 176

MByield = yield, field 28, pos. 128

RAprice = obtained from Actuarial Data Master (ADM)

MBguar = total guarantee, field 35, pos. 184, result of (dollar amount of insurance * acres),

Cover = coverage level, field 31, pos. 158

BPR75 = obtained in calculation of 75% base premium rate for APH based on MByield

MBratefactor = obtained from ADM based on option codes submitted in common option code, field 46, pos. 259

Ratedifferential = obtained from ADM base on coverage level

Basepremium = total premium, field 56, pos. 346

Premsub = subsidy, field 57, pos. 356

Propremium = producer premium, field 62, pos. 388

Rate = base premium rate for feed barley,
field 42, pos. 233,

The following M13 fields will reflect other information required for DAS, using record type 11:

Price Election Amount = field 36, pos. 194, result of ((MBprice – RAprice) price election factor),

Liability = field 39, pos. 214, result of (MBguar * insured share),

Insured Share = field 38, pos. 210

Price Election Factor = field 40, pos. 224, = 1.00

Dollar Amount of Insurance = field 29, pos. 138, result of (MByield * price election amount * cover)

The premiums charged under the RA Malting Barley Price and Quality Endorsement follow the same procedures used to calculate premiums for the APH Malting Barley Endorsement. Premiums will be the same only when the RA projected harvest price for feed barley equals the APH price for feed barley.

Premiums are calculated on a line by line basis and depend on the approved Malting Barley yield that can vary by unit/location/practice, the corresponding APH base

premium rate for feed barley, the coverage level, the malting barley rate factor, the price election amount, the number of planted acres, and the insured's share as follows:

Base Premium = round(rate x Liability x (basic unit discount) x MBratefactor,0)

Rate = round(BPR75 x Ratedifferential,8)

Liability = round(Dollar Amount of Insurance x MBacre x share,0)

Dollar Amount of Insurance = round(MBYield x Cover x Price Election Amount,2)

The price election amount under Option B equals the weighted average malting barley contract price less the RA projected harvest price for feed barley. The price election amount under Option A for malting barley not grown under a contract equals the additional price election value found in the actuarial documents.

Worked Example

An irrigated barley producer in Blaine County, Idaho has a pricing contract for malting barley production and selects Option B.

Variable values

MByield	80
MBprice	2.72
MBacre	200
RAprice	2.00
Cover	80%
BPR75	0.071319
MBratefactor	1.1
Ratedifferential	1.27 for 80% coverage
Subfact	0.48
Share	1.00

Dollar Amount of Insurance = round(80 x 0.80 x 0.72, 2) = \$46.08

Liability = round(46.08 x 200, 0) = \$9,216

Rate = round(0.071319 x 1.27, 8) = 0.09057130

Base Premium = round(0.09057130 x 9216 x 1.1 x .9, 0) = \$826

Premsub = round(365 x 0.48) = \$396

Propremium = \$430

